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The interseminal scales and megasporophylls (stalks bearing terminal ovules), however, are of the *Bennettites* type, but much simpler in structure, although some of the simplicity may be due to immaturity.

It is refreshing to obtain the following statement from an English paleobotanist: "The morphology of the Bennettitean flower is still a problem to be solved, and the attractive hypothesis that would have us regard this dominant group of the Mesozoic era as a guide to the evolution of the class which now occupies the pre-eminent position in the vegetable kingdom, requires to be substantially strengthened before it can claim to have solved the mystery of the origin of the flowering plants."—J. M. C.

Cytology of seedless oranges.—OSAWA²⁰ has investigated the cytological situation in the two seedless oranges known as the "Washington navel" (*Citrus aurantium*) and the "Unshu" (*C. nobilis*), chiefly using *C. trifoliata* as a check species. After showing that spermatogenesis and oogenesis in *C. trifoliata* are as usual among angiosperms, he finds in both the seedless forms a strong tendency toward the disorganization of pollen mother cells and megaspores. In the "Unshu" there is every stage in the failure of pollen development from a failure in the differentiation of sporogenous tissue up to the reduction divisions. In the majority of cases, however, pollen grains are produced. In the "Washington navel," spermatogenesis in the majority of cases does not proceed beyond the mother cell stage. In both forms oogenesis usually proceeds to the formation of megaspores and then fails. As some normal embryo sacs are produced a few seeds were obtained; and the usual failure of seeds is due chiefly to the failure of embryo sacs rather than of pollen grains, especially in the case of the "Unshu." The chromosome numbers in this form are 8 and 16. In *C. trifoliata* it was discovered that fertilization occurs about four weeks after pollination, and the fertilized egg divides three or four weeks after fertilization.—J. M. C.

Pine-barrens of New Jersey.—A careful examination of geological evidence leads TAYLOR²¹ to the conclusion that the pine-barrens of New Jersey coincide in distribution with the geological Beacon Hill formation, an area that has been uninterruptedly out of the water since the Upper Miocene, and has several times been more or less completely surrounded by water. This would make this plant formation by far the oldest in New Jersey. Its xerophytic character does not appear to harmonize well with such a theory, although the number of more or less endemic species would seem to demand a rather complete and extended period of isolation such as the submergence and glaciation

²⁰ OSAWA, I., Cytological and experimental studies in *Citrus*. Jour. Coll. Agric. Tokyo 4:83-116. fig. 1. pls. 8-12. 1912.

²¹ TAYLOR, NORMAN, On the origin and present distribution of the pine-barrens of New Jersey. Torrey 12:229-242. 1912.